

# Bruce Xi

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🌐 brucexi999 • Available from May 2024 - August 2025

## Education

### The University of British Columbia

Vancouver, BC

Master of Engineering in Electrical and Computer Engineering, GPA 4.0

2021–2025

- Relevant courses: Deep Learning, ML Hardware Accelerator, Computer Architecture, Digital Hardware Design, Embedded System, VLSI, IC Testing and Reliability

### Imperial College London

London, UK

Bachelor of Engineering in Materials Science and Engineering

2018–2021

- Graduated with First-Class Honours
- Obtained Dean's List for three consecutive years (2018-2021)

## Experience

### Motorola Solutions

Vancouver, BC

Design Validation Co-op

May-Dec. 2022

- Conducted extensive camera tests in various settings, ensuring accuracy and precision
- Engineered Python-based software for test automation and data analysis, enhancing test efficiency with up to 90% automation
- Utilized FFmpeg for video processing
- Collaborated within a team using Git, Confluence, and Jira to optimize workflow efficiency

## Project

### Multi-agent Deep Reinforcement Learning for VLSI Routing

May-Oct. 2023

- Self-taught DRL and VLSI global routing, demonstrating initiative and commitment
- Developed a multi-agent DRL router using PyTorch and RLlib, the router was equipped with a custom GNN for enhanced policy generalization
- The proposed router guaranteed 0 overflow and outperformed an A\* baseline by 2.6% in terms of wirelength

### Embedded System Development

Jan.-Apr. 2023

- Engineered key components of an embedded system including a 4-way set-associative cache controller and a DRAM controller using Verilog. The cache reduced the runtime of a benchmark by 43%
- Implemented the system on an FPGA with a provided soft microcontroller
- Developed software and firmware in C that interacted with hardware using SPI, IIC, and CAN protocol
- Utilized hardware timer interrupt and designed a snake game software that ran on the embedded system

### CPU Architecture Design

June-Sept. 2022

- Architected a 16-bit RISC CPU from the ground up using Verilog, integrating pivotal components such as FSM, datapath, RAM, and I/O interfaces
- The CPU supported 13 diverse instructions encompassing ALU operations, memory access, and branching mechanisms
- Successfully deployed the system onto an FPGA and validated the design's capabilities by executing a test program

### System-on-Chip Design

Jan.-Apr. 2022

- Designed an SoC which was implemented on an FPGA using Quartus IP Catalog, the system consisted of a soft CPU, an on-chip memory, a memory-mapped interconnect, and I/Os
- Designed custom hardware using Verilog that adhered to the interconnect's communication protocol
- Scripted C programs to interact with the system

## Skills

**Hardware:** Verilog/SystemVerilog, FPGA, ModelSim, Quartus, Cadence

**Software:** Python, C/C++, Assembly, Linux

**DevOps Tools:** Confluence, Jira, Git, GitHub